

Research Article

Deaths from Acute Myocardial Infarction in Adults Aged 40 to 59 in the State of Espírito Santo

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• Acute Myocardial Infarction (AMI); Death; DATASUS; Espírito Santo

Abstract

Introduction: Acute myocardial infarction (AMI) is one of the most serious manifestations of cardiovascular diseases and has a high prevalence among middle-aged adults. Given this scenario, understanding the epidemiological profile of AMI in adults over 40 years of age is fundamental to supporting prevention, early diagnosis, and clinical management actions, contributing to reducing cardiovascular mortality and strengthening healthcare in Brazil.

Objective: This study aimed to outline the profile of deaths from acute myocardial infarction among adults aged 40 to 59 years in the state of Espírito Santo during the period from 2020 to 2023. **Method:** This is an ecological, cross-sectional, quantitative, descriptive, retrospective study with secondary data collected from the database of the Department of Information and Informatics of the SUS (DATASUS).

Results: It was found that 71.5% of deaths correspond to male individuals, regarding race/color 46.87% were mixed race, 47.14% of deaths occurred in the Metropolitan macro-region, and 40.63% occurred at home.

Conclusion: A higher prevalence of deaths was found in 2020, among men, in the metropolitan macro-region of the state, of mixed race/color, and at home.

INTRODUCTION

Acute myocardial infarction is the death of heart muscle cells caused by the formation of clots that interrupt blood flow [1].

In 2022, Cardiovascular Diseases (CVD) caused 19.8 million deaths worldwide [2]. In that same year, in Brazil, approximately 400,000 deaths due to acute myocardial infarction were recorded [3]. In Espírito Santo, data indicates that in 2023, acute myocardial infarction was the cause of death for more than 1,900 people in the state, with a rate of 50 deaths per 100,000 inhabitants per year [4].

A study analyzing the global impact of diseases between 1990 and 2019 identified an increase in cardiovascular disease (CVD) episodes from 271 million to 523 million [5]. In Brazil, it is estimated that there are 300,000 to 400,000 cases of myocardial infarction annually, with one death occurring for every five to seven episodes [1].

Modifiable risk factors for CVD include smoking, sedentary lifestyle, inadequate diet, dyslipidemia, obesity, hypertension, and excessive stress. A poor-quality diet,

characterized by high consumption of ultra-processed foods and insufficient intake of fruits and vegetables, is associated with a higher probability of cardiovascular events [5].

On the other hand, regular physical activity has a protective effect, promoting improved cardiovascular health and metabolic control, and is widely recommended in the prevention and treatment of CVD [6]. Obesity aggravates several metabolic risk factors, such as dyslipidemia, hyperglycemia, insulin resistance, and systemic inflammation, increasing the risk of coronary heart disease.

Acute myocardial infarction (AMI) is one of the most serious manifestations of CVD and has a high prevalence among middle-aged adults. Recent studies reinforce that metabolic and behavioural factors — such as obesity, hypertension, dyslipidemia, and sedentary lifestyle — continue to be determinants of cardiovascular risk.

Mörck et al. [7], demonstrated that the combination of high body mass index and metabolic syndrome significantly increases the risk of myocardial infarction, stroke, and

heart failure, while even individuals with normal weight and metabolic syndrome had approximately twice the risk of AMI. Early identification and screening of individuals at high risk for cardiovascular disease becomes essential, especially those with metabolic risk factors, accompanied by behavioral risk factors.

Given this scenario, understanding the epidemiological profile of acute myocardial infarction in adults over 40 years of age is fundamental to supporting prevention, early diagnosis, and clinical management actions, contributing to reducing cardiovascular mortality and strengthening health care in Brazil. Thus, the study aims to outline the profile of deaths from acute myocardial infarction in adults between 40 and 59 years of age in the state of Espírito Santo from 2020 to 2023.

METHOD

This is an ecological, cross-sectional, quantitative, descriptive, retrospective study using secondary data obtained from the database of the Department of Information and Informatics of the Brazilian Unified Health System (DATASUS).

Data collection was carried out using the TABNET/DATASUS platform, considering cases of general mortality due to Acute Myocardial Infarction identified by the cause ICD-BR-10 068. To delimit the data to the relevant area of interest, filters were applied, considering the period from 2020 to 2023, and the following variables: age group, health macro-region, sex, race/color, and place of occurrence.

The information obtained was organized and tabulated in an electronic spreadsheet (Microsoft Excel) by the authors, in which the data were systematized and a descriptive table was created.

RESULTS

Regarding sex, it was found that 71.5% of deaths correspond to male individuals, while 28.5% correspond to female individuals (Table 1).

Regarding race/color, the following percentages were observed: 33.46% white, 11.76% black, 0.19% Asian, 46.87% mixed race, and 0.06% indigenous. 7.62% did not have their race/color recorded (Table 2).

Regarding the health macro-region, the south recorded 24.91% of deaths, 47.14% in the Metropolitan area, 28.07% in the North Central area, and 0.19% did not have the macro-region recorded (Table 3).

Regarding the location of the incident, 39.18% of deaths occurred in hospitals, 12.03% in other healthcare

facilities, 40.63% at home, 3.48% in public places, 4.6% in other locations, and 0.06% did not have the location of the incident recorded (Table 4).

DISCUSSION

DATASUS data indicate a higher number of deaths from acute myocardial infarction in adults aged 40 to 59 in 2020 (25.7%), compared to 2021 (25.4%), 2022 (23.7%), and

Table 1: Year of Death and Sex

Year	Male	Female	Total
2020	266 (17,5%)	125 (8,2%)	391 (25,7%)
2021	281 (18,5%)	106 (7,0%)	387 (25,4%)
2022	262 (17,2%)	98 (6,4%)	360 (23,7%)
2023	279 (18,3%)	104 (6,8%)	383 (25,2%)
Total	1088 (71,5%)	433 (28,5%)	1521 (100%)

Source: DATASUS

Table 2: Year of Death and Race/Color

Year	Branca	Black	Yellow	Parda	indigenous	Ignored	Total
2020	127 (8,34%)	48 (3,15%)	2 (0,13%)	181 (11,90%)	-	33 (2,16%)	391 (25,70%)
2021	138 (9,07%)	42 (2,76%)	-	170 (11,17%)	-	37 (2,43%)	387 (25,44%)
2022	124 (8,15%)	45 (2,95%)	-	173 (11,37%)	-	18 (1,18%)	360 (23,66%)
2023	120 (7,88%)	44 (2,89%)	1 (0,06%)	189 (12,42%)	1 (0,06%)	28 (1,84%)	383 (25,18%)
Total	509 (33,46%)	179 (11,76%)	3 (0,19%)	713 (46,87%)	1 (0,06%)	116 (7,62%)	1521 (100%)

Source: DATASUS

Table 3: Year of Death and Health Macroregion

Ano	Sul	Metropolitan	North Central	Ignored	Total
2020	99 (6,50%)	190 (12,49%)	101 (6,64%)	1 (0,06%)	391 (25,70%)
2021	108 (7,10%)	171 (11,24%)	107 (7,03%)	1 (0,06%)	387 (25,44%)
2022	81 (5,32%)	177 (11,63%)	101 (6,64%)	1 (0,06%)	360 (23,66%)
2023	86 (5,65%)	179 (11,76%)	118 (7,75%)	-	383 (25,18%)
Total	379 (24,91%)	717 (47,14%)	427 (28,07%)	3 (0,19%)	1521 (100%)

Fonte: DATASUS

Table 4: Year of Death and Place of Occurrence

Year	Hospital	Other health facilities	Domicile	Public road	Other	ignored	Total
2020	144 (9,46%)	49 (3,22%)	159 (10,43%)	15 (0,98%)	23 (1,51%)	1 (0,06%)	391 (25,70%)
2021	179 (11,76%)	48 (3,15%)	131 (8,61%)	10 (0,65%)	19 (1,24%)	-	387 (25,44%)
2022	120 (7,88%)	44 (2,89%)	167 (10,97%)	17 (1,11%)	12 (0,78%)	-	360 (23,66%)
2023	153 (10,05%)	42 (2,76%)	161 (10,58%)	11 (0,72%)	16 (1,05%)	-	383 (25,18%)
Total	596 (39,18%)	183 (12,03%)	618 (40,63%)	53 (3,48%)	70 (4,60%)	1 (0,06%)	1521 (100%)

Fonte: DATASUS

2023 (25.2%). During the pandemic, there were delays both in seeking care and in receiving medical attention, as well as a higher number of deaths from cardiovascular diseases recorded at home and in nursing homes.

Greater severity of cases arriving at hospitals was also reported, suggesting that fear of contagion, social isolation campaigns, and the overload of emergency services contributed to patients delaying or avoiding hospitalization [8].

Furthermore, in the study by Guimarães et al. [9], an ecological survey was carried out with data from the Mortality Information System (SIM), covering the entire national territory, and the authors observed that, in 2020, the group of cardiovascular diseases showed an increase of about 16% in deaths, configuring itself as one of the groups whose death numbers exceed what was expected for the period analyzed.

When observing the data by location of occurrence among adults aged 40-59, it was found that the majority of events were recorded in hospital settings (39.2%) and at home (40.6%), while only 3.5% occurred in public places. This pattern of a high proportion of events at home and a relative reduction in public places is consistent with studies showing that a large proportion of acute cardiac arrests outside the hospital occur in the home environment, which explains the high burden of home care and the challenges for immediate responses by witnesses [10].

Although less frequent, events in public places have a high impact in terms of opportunity for intervention by laypersons: Cardiopulmonary Resuscitation (CPR) by witnesses and the use of automated external defibrillators such as AEDs in public places are consistently associated with greater survival and better functional outcomes when compared to the absence of immediate intervention [11].

Furthermore, robust evidence indicates that early recognition of acute myocardial infarction in a pre-hospital setting, through pre-hospital 12-lead electrocardiogram (ECG) with immediate transmission, and early activation of the coronary intervention service reduce delays and improve outcomes in patients with STEMI (ST-Segment Elevation Myocardial Infarction), highlighting the importance of well-structured pre-hospital protocols and integration between emergency services and intervention centers [12,13].

Thus, the findings in the table reinforce the need for public policies that expand CPR education for families and the community, increase the availability and mapping of AEDs in public and residential areas, and strengthen the

capacity for pre-hospital diagnosis and referral of acute myocardial infarction to reduce time to reperfusion and improve prognoses in middle-aged adults.

Analyzing deaths that occurred between 2020 and 2023, a higher number of cases were observed among individuals who self-identified as mixed-race (46.9%), followed by white (33.5%) and, to a lesser extent, black (11.8%). Records classified as unknown accounted for 7.6%, while the categories of Asian (0.2%) and Indigenous (0.07%) showed minimal participation. This pattern reflects the predominantly mixed-race and white demographic composition of Espírito Santo.

The reduced participation of Indigenous people in the examined records refers exclusively to the morbidities analyzed. However, it is pertinent to mention the study by Santos and Mill [14], conducted with Indigenous people living in villages in Aracruz (ES), which identified a prevalence of 52.1% of multimorbidity, especially among adults over 40 years of age. Although this result is not included in the data of the present analysis, as it deals with a different concept, it contributes to broadening the understanding of the health profile of this population.

Regarding the health macro-region, approximately 47% of acute myocardial infarction cases within the studied age range occurred in the metropolitan region of Espírito Santo. In contrast, approximately 24% occurred in the southern region of the state, and about 28% in the central-northern region; the region for the remaining cases was not reported.

The data indicate a higher prevalence of cases in the metropolitan region, which can be partly explained by the larger number of people living in this area compared to other regions, since, according to the IBGE (Brazilian Institute of Geography and Statistics) census, 49% of the population of Espírito Santo lives in the metropolitan region [15].

In addition to the quantitative factor, the higher prevalence of cases in the metropolitan region can be explained by characteristics of the place of residence. As pointed out in the study by Daniel, Moore, and Kestens [16], environmental variables are related to the probability of death from cardiovascular diseases. These variables include exposure to traffic-related noise, which is more prevalent in urban areas, such as the metropolitan region of Espírito Santo, and which increases the biological response to stress, influencing cardiovascular health.

Observing data related to the death rate due to acute myocardial infarction from 2020 to 2023 and comparing

the results for men and women in Espírito Santo, it was observed that the number of women who died from this cause was lower than the number of men.

Studies using the 10-year ASCVD (Atherosclerosis Cardiovascular Disease) risk score – a tool developed by the American College of Cardiology and the American Heart Association that estimates the probability of a person having a cardiovascular event in the next 10 years – have shown that men are more likely to have a higher 10-year CVD risk score [17]. On the other hand, some studies show that women are less likely to undergo revascularization and have higher hospital mortality rates [18].

In the age group over 40, women who suffer a heart attack accumulate more risk factors such as diabetes, hypertension, and high cholesterol levels [19]. Furthermore, when analyzing the prevalence of myocardial infarction, it was found that the prevalence was higher in men; however, the mortality rate was higher in women, highlighting the increased morbidity and mortality rate in women [19].

A study comparing regions of Brazil showed that in the Southeast region, 66.4% of patients hospitalized with myocardial infarction were male [20]. In general, the predominance of cardiovascular disease among men is justified by quality of life: men smoke more, consume larger amounts of alcoholic beverages, and are less likely to engage in physical activity (Medicina UFMG, 2011).

CONCLUSION

It is concluded that the number of deaths from acute myocardial infarction in adults aged 40 to 59 in the state of Espírito Santo had a higher prevalence in 2020 compared to other years studied. The most prevalent place of occurrence was at home, and regarding race/color, there was a predominance among mixed-race individuals. Regarding the health macro-region, the metropolitan region of the state predominated, and regarding sex, the number of deaths from acute myocardial infarction was higher among men.

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